



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : E04B 1/344, E04H 12/18, 5/12, A61F 2/06, A61B 17/16, 17/02, A61F 13/20, 2/04	A3	(11) International Publication Number: WO 00/12832 (43) International Publication Date: 9 March 2000 (09.03.00)
(21) International Application Number: PCT/US99/19457 (22) International Filing Date: 26 August 1999 (26.08.99) (30) Priority Data: 09/140,510 26 August 1998 (26.08.98) US (71) Applicant (for all designated States except US): MOLECULAR GEODESICS, INC. [US/US]; 20 Hampden Street, Boston, MA 02119 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): CLIFFORD, Dale, Timothy [US/US]; 311 Lamartine Street, Boston, MA 02210 (US). INGBER, Donald, E. [US/US]; 71 Montgomery Street, Boston, MA 02116 (US). (74) Agent: ANASTASI, John, N.; Wolf, Greenfield & Sacks, P.C., 600 Atlantic Avenue, Boston, MA 02210 (US).		(81) Designated States: JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 15 June 2000 (15.06.00)
(54) Title: RADially EXPANDABLE DEVICE (57) Abstract <p>An expandable device is provided that includes a plurality of elongated members that are positioned and arranged to define a lattice structure having crossing points (or nodes) along interior positions of the elongated members. Preferably, the lattice structure is a hyperboloid of revolution. The device includes a plurality of flexible interconnectors located at the crossing points for securing one elongated member to another. The device is radially compressible and expandable. The device may include flexible joiner elements at that join at least two elongated members together at their ends to form an apex. The device may be used in a variety of applications including medical applications such as surgical retractors, space creators, endoluminal prosthesis, such as catheters, dilators or stents, mechanisms for expanding stents, controllably catheters, drains or valves and connectors for hollow organs. The device may also be used in building and construction applications such as emergency shelters, housing structural supports, receptacles, masts and cooling tower support structures.</p> <div> </div>		

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 99/19457

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E04B1/344 E04H12/18 E04H5/12 A61F2/06 A61B17/16
A61B17/02 A61F13/20 A61F2/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E04B E04H A61F A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>EP 0 744 575 A (ALEPH CO LTD) 27 November 1996 (1996-11-27)</p> <p>page 2, line 5 - line 8 page 2, line 48 - line 54 page 10, line 10 -page 12, line 14 page 13, line 24 -page 14, line 35 page 15, line 29 -page 16, line 9 page 17, line 3 - line 32 page 19, line 19 - line 38; figures 1-11,21-28,35-37,41,42,60-63 ---</p> <p style="text-align: center;">-/-</p>	<p>1-3,5-7, 17,20, 21,26, 27,29, 30,38, 51,53, 55,63, 64,67, 68,71, 72,74,75</p>

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

20 December 1999

Date of mailing of the international search report

17.04.2000

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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 99/19457

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 91 719 E (SOISSON) 2 August 1968 (1968-08-02) page 1, left-hand column, line 1 -page 2, left-hand column, line 15 page 2, right-hand column, line 38 -page 3, left-hand column, line 47; figures 1-4 ---	1-7,9, 20,21, 26,27, 32,37, 38,63, 64,68, 71,72,75
X	US 4 290 244 A (ZEIGLER THEODORE R) 22 September 1981 (1981-09-22) column 2, line 31 -column 4, line 60; figures 1-6 ---	1-7, 27-30, 37,38, 63,64, 68,71, 72,75
X	US 4 825 225 A (WATERS TERRANCE J ET AL) 25 April 1989 (1989-04-25) column 4, line 19 -column 5, line 66; figures ---	1-3,5-7, 17,20, 21, 24-26, 28-30, 32,37, 63,65
X	US 4 115 975 A (BLISS ROBERT L) 26 September 1978 (1978-09-26) column 3, line 7 -column 4, line 52 column 7, line 23 -column 9, line 3; figures 1-10 ---	1-3,5-7, 12,27, 29,30, 37,53, 63,64, 67,71, 72,75
X	US 4 253 284 A (BLISS ROBERT L) 3 March 1981 (1981-03-03) column 6, line 48 - line 64; figures --- -/--	1-3,5-7, 28-30, 63,64, 68, 71-73,75

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 99/19457

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>US 4 276 726 A (DERUS DAVID L) 7 July 1981 (1981-07-07)</p> <p>column 1, line 6 - line 14 column 3, line 13 -column 4, line 47; figures 1,4</p> <p style="text-align: center;">---</p>	<p>1,3,5-7, 29,31, 54,63, 64,71, 72,74,75</p>
A	<p>FR 976 692 A (CHEVREAU & AL) 21 March 1951 (1951-03-21)</p> <p>page 1, left-hand column, line 1 -page 2, left-hand column, line 6 page 2, left-hand column, line 22 - line 25; figure 1</p> <p style="text-align: center;">---</p>	<p>1,2,17, 20,25, 27,53</p>
A	<p>FR 2 149 711 A (BAU MONTAGEKOMBINAT KOHL) 30 March 1973 (1973-03-30) page 1, line 1 - line 5 page 3, line 33 -page 4, line 26; figure</p> <p style="text-align: center;">-----</p>	<p>1,2,52</p>

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 99/ 19457

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-18, 20-38, 51-55, 63-76.

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-18,20-38,51-55,63-76 (searched)

Use of a radially expandable and contractable device in the field of building construction and civil engineering.

2. Claims: 1,19,39-50,56-62 (not searched)

Use of a radially expandable and contractable device in the medical field.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inte. nal Application No

PCT/US 99/19457

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